What is claimed is:

1. A microfluidic pump driven by thermoacoustic effect, comprising:

a fluid-storing tank;

at least one microchannel, arranged at the tank body of the fluid-storing tank for communicating the fluid-storing tank with outside world;

a thermoacoustic device, further comprising:

a resonant tube, within which stores a working gas and forming a resonant acoustic wave;

at least one stack, arranged in the resonant tube;

a heater, fixed in the resonant tube and located at one side of the stack; at least a heat exchanger, arranged at a side of the stack in the resonant tube opposite to the heater ; and

wherein, a working microfluid is stored in the fluid-storing tank, and the heater located at the side of the stack heats the working gas such that a temperature gradient greater than a critical temperature gradient between the two sides of the stack is formed, and consequently, the acoustic wave is generated.

2. The microfluidic pump driven by thermoacoustic effect according to claim 1, wherein the microfluid stored in the fluid-storing tank is driven by the acoustic wave generated by the thermoacoustic device, and the driving direction of the pressure fluctuation is parallel to the transmitting direction of the acoustic wave.

3. The microfluidic pump driven by thermoacoustic effect according to claim 2, wherein the pressure fluctuation generated by the thermoacoustic device is capable of causing a volume variation of the fluid-storing tank, and the driving force generated by the volume variation will squeeze the working fluid in the fluid-storing tank to flow through the microchannel.

4. The microfluidic pump driven by thermoacoustic effect according to claim 1, further including a plurality of holes arranged at the resonant tube near the antinode of the pressure fluctuation generated in the thermoacoustic device, which enable the direction of a velocity

fluctuation to be perpendicular to the transmitting direction of the acoustic wave, moreover, the fluid-storing tank storing the working fluid is cooperatively arranged at the outside of the holes.

5. The microfluidic pump driven by thermoacoustic effect according to claim 4, wherein the holes capable of generating velocity fluctuation is arranged at any location of the resonant tube of the thermoacoustic device.

6. The microfluidic pump driven by thermoacoustic effect according to claim 1, wherein the acoustic wavedrives the microfluid in the resonant tube in the direction parallel to the transmitting direction of the acoustic wave, and the fluid-storing tank arranged with microchannels is located at an end of the resonant tube wall opposite to the heater, and at least a flow exit is arranged on the resonant tube wall at the position opposite to the heater.

7. The microfluidic pump driven by thermoacoustic effect according to claim 6, wherein the thermoacoustic device is composed of two sets of stacks or more, such that the flow uniformity of the working microfluid is enhanced.

8. The microfluidic pump driven by thermoacoustic effect according to claim 1, wherein the stack is further composed of a plurality of plates and a plurality of support elements supporting the plates.

9. The microfluidic pump driven by thermoacoustic effect according to claim 1, wherein the heat exchanger is further composed of plural fins and pipes, and the fins are arranged fixedly at and parallel to the pipes.

10. The microfluidic pump driven by thermoacoustic effect according to claim 9, wherein the pipe is a straight tube or a bent tube.

11. The microfluidic pump driven by thermoacoustic effect according to claim 9, wherein each fin is parallel to the plate of the stack.

12. The microfluidic pump driven by thermoacoustic effect according to claim 9, wherein the stack is made of materials of low thermo-conductivity.